The Madras Forest College Magazine.

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THE

Madras Forest College Magazine.

(PUBLISHED QUARTERLY).

Vol. XXI. DECEMBER 1936. No. 2.

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Things I have just seen in ' Rab ' work.

By,

S. Raghunatha Rao, I. F. S.

Since the note that appeared in the *Indian Forester* February 1934, and September 1935, considerable experience has been gained in the technique of ' Rab ' regeneration by Mr. J. A. Wilson, I. F. S. (District Forest Officer, Chittoor). This note is being written after my recent visit to Chittoor District, with a view to bring my previous notes up-to-date.

' Rab ' Regeneration as practised in Chittoor Division :

Heaping. ' Debris ' in felled coupes is heaped by contractors as a part of the contract. On fairly level ground, the heaps generally are 50 ft. × 20 ft. and 3 ft. to 4 ft high, after being well beaten down. On medium and steep slopes, the lines run contourwise, not less that 75 ft. long and 10 ft. wide and 3 ft. to 4 ft. high.

Burning. This is done by concerned beat staff under the supervision of a forester, taking care to prevent the fire from spreading over the coupe; the burning is done against prevailing wind, and at a time when the fire hazard is least, i. e., in the evenings from 6 P. M. onwards and not later than 10 P. M.

Soil and ash mixing. To ensure all the ash (resulting from burning of ' debris ' heap) being fixed to the ' Rab ' ash and soil mixing is done almost immediately after the ash has cooled down. It is done in lines 6 inch wide × 6 inch deep by means of pick-axes, lines being 2½ ft. to 3 ft. apart. Labour is employed for this work paying a rate at 0–3–0 per 1000 Sq, ft. To prevent surface wash, the lower side of the lines situated on sloping ground, is bunded with stones found on the ' Rab ' or by small branches pegged across any depressions likely to be washed (these bunds have been found to do much good in holding soil, seed and ash mauure).

Collection of seed. Much care is bestowed as regards the origin of seed. Good mother trees of good form and health are selected and numbered in each beat and only good seeds are collected. As far as possible local seed is preferred for obvious reasons.

Species tried: The following species have been tried in Chittoor :—

1. Cassia siamea.
2. Cassia fistula.
3. Cassia marginata.
4. Cassia montana.
5. Acacia sundra.
6. Acacia leucophloea.
7. Acacia ferruginea.
8. Pterocarpus santalinus.
9. Pterocarpus marsupium.
10. Albizzia amara.
11. Albizzia lebbek.
12. Albizzia stipulata.
13. Albizzia odoratissima.
14. Azadirachta indica.
15. Cleistanthus collinus.
16. Dalbergia latifolia.
17. Dolichandrone crispa.
18. Dolichandrone falcata.
19. Eugenia jambolana.
20. Hardwickia binata.
21. Pterospermum suberifolium.
22. Tamarindus indica.
23. Tectona grandis.
24. Wrightia tinctoria.
25. Zizyphus jujuba.
26. Pithecolobium dulce.
27. Eriodendron anfractuosum.

Species suited to large variety of soil conditions :—

1. Cassia siamea.
2. Albizzia lebbek.
3. Zizyphus jujuba.
4. Wrightia tinctoria.

Species found to be proof against browsing :—

1. Cassia siamea.
2, Cleistanthus collinus.
3. Pterospermum suberifolium.
4. Wrightia tinctoria.
5. Zizyphus jujuba.

Species susceptible to browsing :—

1. Pterocarpus marsupium.
2. Pterocarpus santalinus.
3. Albizzia amara.
4. Albizzia lebbek.
5. Azadirachta indica.
6. Dalbergia latifolia.
7. Hardwickia binata.
8. Tamarindus indica.

Species that will grow on fairly stiff soils :—

1. Pterocarpus marsupium.
2. Hardwickia binata.
3. Albizzia odoratissima.

Species that grow well on typical Acacia sundra ground i. e. areas supporting stunted growth of thorny species :—

1. Acacia sundra.
2. Albizzia lebbek,
3. Acacia leucophloea.
4. Albizzia amara.
5. Azadirachta indica
6. Dolichandrone crispa.
7. Zizyphus jujuba.

Species that are not much good for reasons given againt each :

1. *Albizzia amara*. Gives very little shade and is poor in growing.
2. *Tamarindus indica*. Being a minor forest produce yielding species seems undesirable to have in fuel coupes. Besides it will not tolerate any other species growing under it.
3. *Azadirachta indica*. Seed of this species not available till late in May or June, by which time sowings will have been completed. It is liable to attack by rats in certain localities.

4 *Eugenia jambolana.* Likes water logged area (closed streams.)

Date of sowing. May is found to be the best month for sowing in Chittoor. In Cuddapah and South Salem up to middle of June is allowed for this operation.

Method of sowing. Untreated seeds are sown lightly and singly in lines, at a depth not greater than the thickness of the seed. Experience has shown that a depth of ½ in. is good to prevent surface wash as also sowing of untreated seed as the seed has to lie waiting for rain, in dry localities.

After-care. Soil working is of the greatest importance. The secret of this operation is not so much to aerate the soil, as to fix rain in the soil by facilitating percolation into it. It is done free by subordinates before rains set in, and again a month after germination is first observed, (being only surface workings these operations do not involve much strain). Between June and November, soil working is done about a dozen times, with very beneficial results. A soil working is done 3 in. away from seedling, working outwards and deeper so that by October soil adjourning seedlings one foot wide and 3 in. deep is worked up.

In February following the year of sowing a final deep soil working 6 in. wide × 6 in. deep half way between lines is done to tide the plants over a hot weather. This is paid for at 0–3–0 per 1000 Sq. ft.

Tending. Seedlings grown densely are pulled out to remove congestion before the North East Monsoon.

Second Year : " *After-care.*" Gradual thinning of crowded plots is carried out to give dominant plants growing space. Resowing of failure plots is not resorted to (in the first year resowings are done repeatedly until October if no germination is observed within three weeks of a good rain).

'Rab' as a measure of fire protection :

Mr. Wilson has raised two long lines of live fire-belts of *Cassia siamea* in Nagapatla Reserved Forest which are very good indeed. The lines are twenty feet wide. In the middle useful species such as *Albizzia lebbek* etc., are raised.

If *Cassia siamea* is a poor fire resister, it would seem desirable to have an outer line of Dodonea viscosa. It seems hopeful that this method of fire protection has possibilities.

I stated in February 1934 that selection of species suitable for each Division with varying degrees of rainfall and temperature and differences in soil conditions, is of the greatest importance as on it the entire success or otherwise of 'Rab' work depends. One or more species found to suit a district as a result of experiments carried out in it may not suit another district. Mr. Wilson's results now definitely show that the following species are best suited to Chittoor Division.

As elsewhere, in Chittoor (a dry district) the problem of soil protection makes 'Rab' regeneration with species like *Dolichandrone crispa* and *Cassia siamea* of paramount importance. I have seen areas in which the clayey nature of soil does not allow rain water to percolate and be retained in the soil. The danger from fire is as great here as in the Cuddapahs and Kurnools.

There has been yet another problem, viz., the difficulty to secure natural regeneration of Red Sanders (*Peterocarpus Santalinus*). The seedlings of this species raised by the 'Rab' method are extraordinarily well grown from direct sowings.

Mr. J. A. Wilson's clever idea of raising an outer belt of *Cassia siamea* as proteetion against 'browsers' and possibly against fire, of manipulating the density of these 'surrounds' by timely pruning sheltering Red Sanders while young and giving more and more light as it advances in age, mixing of species (grown inside a surround of *Cassia siamea*) to prevent insect, fungal and other damages, have given 'Rab' results an excellence which is difficult to describe.

Some Suggestions :

' Rab ' is skilled work. Plants are not worth growing at all unless they are happy, for bare soil is less ugly than ailing vegetation. Unless, therefore, we are prepared to take the needful trouble to grow things that are not starved and unhappy, it is well to keep out of the ' Rab ' business.

" Sowing " is skilled work. How skilled, only those who have done know. When the seed has been carefully tested and selected, then comes the testing of the sower. If he lacks a certain knowledge, or a certain patient carefulness in detail, the best seed in the world will do badly.

Factors to keep in mind. When we have chosen the best seed, an attempt to fit seed to environment is necessary. All Districts have their peculiar characteristics.

The soil is of vital importance. Half the battle is almost in the preparation of the soil. No end of failures can be traced to inadequate or careless preparation. Insufficiency of ' burn ' will spoil the entire labour and money spent on ' Rab ' work.

In actual sowing, the end in view is to get close contact between soil and the seed. How that is done will depend on the character and size of the seeds. With some of the seeds, downy and feathery ones, as well as with some of the tiniest seeds that is peculiarly difficult. Finest seeds before sowing should be mixed with many times their own bulk of earth or ash. Nor should seeds be set too near together, or too deep in the earth. Every seed has its own most favourable conditions for germination.

The sower must have foresight.

Then, there is the occasion of sowing to be considered. How patiently the true forester waits for the right sort of day, a calm day without wind, a dry day with friable soil. How near the break of rains he is able to judge and time his sowing, is a test of his ability.

After-care : When he has taken every care in the choice and the sowing of seed, the responsibility is by no means at an

end. The after-care of the seedling is as important as the proper mode and time of sowing. Plants have their foes, general and special. Infantile mortality among plants is very high and the proportion of stunted anaemic growths—plants which never come to full use—is also unnecssarily large. How many failures can be traced to neglect in the early stages and how many spoilt crop to belated aid! Weeds have their vulnerable season when we must be out doing battle against the green growing foes, that unfought will destroy our tiny hopes

Selection of site for 'Rab':

Selection of 'Rab' site is an important factor on which success or otherwise will depend. It should be selected with reference to (1) nature of the ground (2) on sloping ground, contourwise to avoid surface wash (3) blanks which Nature herself could not clothe had better be avoided (4) very stony and badly cut up ground is unsuited (5) steep slopes limit the size of site as 'pockets' containing some soil capable of supporting seedlings are few and far between (6) ground subjected to water-logging will not suit all except a few species that do not mind it, e. g. *Terminala arjuna*, *Pongamia glabra* etc., (7) stream beds and water courses are generally ill-suited for 'Rab' unless seeds can be protected from being dislodged by adopting 'barraging' with stones and branches (resultant seedlings curiously enough are well grown.)

Best size and shape of Rab plot:

'Rabs' up to 100 ft. long and 20 ft. wide are most convenient to supervise for (1) soil and ash mixing (2) making pick-axe lines and (3) small sized 'rabs' are apt to get lost in coupes subjected to heavy undergrowth of grass, climbers, creepers etc., 50 ft, × 20 ft. seems an ideal size.

Best type of burn and time for burning:

Too hot a burn bakes the soil and breaks it up. This is not desirable. The burn that tends to sterilize the soil and transmit the heat to anything up to 6 in. depth seems the ideal burn. To get this result 'debris' needs to be well heaped and

compressed down before being ignited as otherwise the fire tends to dissipate itself in the air much above the ground. 'Rabs' reduced to ashes in February–March, ash and soil mixed and allowed to lie fallow till May—June, have given best results.

Density of sowing or planting :

An espacement of 2½ ft. to 3 ft. between lines and light sowing of seeds in pick-axed lines to roughly two seeds every six inches apart seems to give good results. For planting 4 ft. × 4 ft. seems the best espacement.

Conclusions :

1. In districts where in browsing by members of the deer family is a menace it is essential to have "surrounds" of *Cassia siamea*, to 'Rab' plots.

2. If a coupe is wholly or partly fenced, better to reduce the same to ashes when your 'Rab' seedlings have grown beyond the reach of cattle and sow *Bombax malabaricum* and put out cuttings of *Poinciana elata* in the line during raining season.

3. 'Debris' to be *at all* useful for 'Rab' work, *should* be heaped while green and well beaten down. Contractors avoid this work as much as possible. Therefore, it would be desirable to have strips of not more than 15 acres and get the heaping done then and there before allowing work in a new strip.

4. Where there is demand for manure leaf, better to grow as much of *Cassia siamea* and *Wrightia tinctoria* as possible in 'Rabs'.

5. It would be a help if a Ranger who shows aptitude and keenness for 'Rab work is allowed to be in the same Range for as long a period as possible (consistent with exigencies of service and unforeseen circumstances) to maintain continuity of policy. This seems necessary even as regards District Forest Officers.

The Guardians of the Hills.

By,

A. Yegnaswami, B. A., M. R. H.

The rugged often steep stony footpath takes you to the top through the deciduous scrub jungle. The ' Koil ,' the ' Mynah,' the ' Shenboth,' and beautiful pairs of wild doves and partridges and other millions of multicoloured birds sing their own tunes; the weary Forester plods his way through thick and thin hearing a distant cutting sound. You reach the plateau 2500 ft. above sea level. You hear the little hill brook, the feeder of a big river, making its way through stones with a gurgling sound. Now you enjoy the brilliant rays of the morning sun piercing through the green foliage. You enjoy the gentle and cool breeze which alleviates all at once the tiresomeness of your ascent. Wherever you turn you see the tall bamboos gently wafting their slender heads in the high sky. You walk the winding ways and narrow paths through high and low fields and at a distance you see a thin circle of smoke coming from a low roofed, mudwalled, thatched hut and, reader, now you are in a hill village in the Javadis.

A small boy of five, naked and clean shaven, with the dirt of his age on his thin emaciated body, with a snub nose, where you see the marks of cold, with a pot belly stuffed with cholam and raghi, runs into the hut, on seeing you, with his little sister of three, who is also naked with a pot belly and lank lean hands and legs, and who has a few hairs left on her head that were woven into a pig tail and adorned with wild flowers. Though there was nothing unusual about you—a tailor-made Gent ! — still they raise a hue and cry which cause the few dogs to bark at you. You will come to know afterwards it was due to the fear they had of the vaccinator. The gentle breeze which wafted for you all the fragrance of the hills is no longer in evidence when you reach the village, and instead, the foul smell

of cattle and pigs greet you. You see some hens with their young ones picking food from the dungheep and a few goats munching their food within the pen. You will have to cross the bamboo fence which sorrounds the huts.

Of course, readers, it is very rupulsive to be in a 'Malayalee' hut. But at the same time you are given an opportunity to contemplate and compare the poverty stricken, famished, unhealthy,—due to malaria—half naked, but happy and self contented villagers having a few acres, their property, depending completely upon nature, with the more civilized and favoured dwellers of the plains.

Really there cannot be any comparison except for the Tamil language you speak.

A village consists of ten to twenty houses constructed here and there without any arrangement, in the rudest and the simplest way, with nature's raw material. The huts are very low, and with walls of bamboo *thatis* plastered with mud and cow dung. The 'Malayalee' does not believe in light and ventilation and there is no provision for them in his building estimate. Though most of them are generally tall still they have their only doorway a very small and narrow one. Generally bamboo thatis only are used for doors.

The males are commonly named as *Periapayyan* (bigboy), *Chinna-payyan* (small boy), and *Nadupayyan* (middle boy), *Karupan* (if he is black), *Vellayan* (if he is white), and the females are named in like manner with an *Akka* (sister) for *Payyan.* But now-a-days due to their mingling with the plainsmen they are beginning to use other Tamil names.

Though a set of lazy and careless fellows who like to sit and chat in the sun or near a fire, who take urgent and serious things in an easy manner, who do not show any sense of responsibility, aud who try to be equal with you, these Malayalees are simple and good fellows and fear very much the civilized men of the plains. Do not be offended, Reader, if he addresses

you in singular, because he was not taught the terms of respect nor wishes to learn them. You may be an expert physiognomist, but you will not be able to tell whether a Malayalee is intelligent or dull, a rogue or a simple fellow. Nothing of your humour or wit will be of any use to him. But they will come and surround you as if you are a very curious specimen of humanity. Ask his name in a tone of authority, he will not tell you lest you may entangle him in a case. He abhorrs law courts and things of that kind.

The men wear a small loin cloth to cover their modesty and a big cloth to cover their body above ; another small and dirty cloth forms their turban. But when they go to the plains they tie a more decent cloth round their waist. The women dress like peasants of the plains of Vellore or Tiruppattur. They generally use a piece of cloth in the hills but on state occasions and when they go to the plains they use a full *sari*, costing below five rupees. Jacket and bodice were unknown to them but now one or two rich girls are trying to use them.

Malayalees as a whole are agriculturists. They till their rocky fields and try to produce Raghi, Cholum, Kambu, Samai. Varagu, Horsegram, Blackgram, Castorseeds etc. Paddy is very rare in the hills. The head of the family is in possession of all lands and members are given portions for their own use. They can raise the above mentioned crops if, — indeed ! a very big if, — nature helps them. But the Government taxes them, on an average, twelve annas per acre for the benefit they derive from nature ! In return for this tax no help is rendered to these people by the Government. But this is in a way compensated by the Forest Department which gives them work and enables them to eke out their livlihood.

Though monogamy is the prevailing system polygamy is also in existence. Divorce takes place as an ordinary matter of daily occurrence without any fuss about it. The much hated but the all prevailing system of dowry exists here also but in a

different form. As the girls are in less numbers here, the bridegroom instead of the bride will have to shell out the money. Child marriage as well as adult marriage takes place here. There is an interesting method of marriage here which we might have read of in the legends of ancient Greece and Rome. Suppose a man is poor and he wishes to marry. Somewhere on his way if he meets with an unmarried girl he is simply to touch the girl and his friends are to take the girl a captive to his village. Then they will send word to the father of the girl arranging for the marriage. Elders in the place will coax her to marry the man who touched her and if she is willing she will be married to him on his paying a maximum sum of fifty rupees. The marriage will be celebrated at the bridegroom's place. If the girl or her parents are not willing for the marriage it will not take place. Immorality exists with in the community and when found out the punishment will be rather severe. If a woman elopes with a man, she will be allowed to come back to her husband only after payment of a fine and purification ceremony. But if she refuses to come back all the children born to her by her former husband as well as the present husband belong only to the man who first married her.

The Malayalee worships the minor deities of the Hindu mythology and believes immensely in their power. He has got his own astrologer, magician and physician. He follows the Tamil calendar year.

He buries his dead. The funeral takes place soon after death for no one can take food when there is a corpse in the village.

In my humble opinion civilization instead of improving the self sufficing village community has spoiled them for most of them have become debtors to the plains moneylenders. When nature fails him, and when the moneylender troubles him, and there is nothing for him to eat and drink the malayalee runs with or without his wife to Ceylon and earns his livlihood there.

You know they are a set of conservatives as other hill villagers are, and so when he returns to the village from Ceylon he is to undergo a purification ceremony for which he is to pay a few rupees to the headman of the village.

The Malayalee has got his own history. Three unemployed *Vysia* or *Sudra* brothers from Conjeevaram started from their home in quest of employment. On the way they separated. One man marrying a *Vysia* woman settled in the Pachai Hills, another married an *Adidravida* woman and settled at the Kolli Hills while the third eloped with a *Veda* woman, went and settled in the Javadis. Though there are some minor differences between groups of Malayalees yet from a historical standpoint they seem to belong to one and the same community. Though there are no other communities living in these malaria ridden hills still we cannot say that these Malayalees are the aboriginal tribes, for they speak a moderately good Tamil. From this and from their manners and customs we may possibly conclude that these people were Tamilians who took asylum in the hills when defeated by the Mohammadan rulers of Arcot and Vellore.

Let me conclude by a brief mention of their administration. Every village has its Headman or *Ooran* who is appointed by the Oorans of ten other villages with the consent of the villagers concerned. Generally the son of the *Ooran* or any rich man in the village is chosen. He is also approved as head-man by the Forest and the Revenue departments. The villagers will have to protect the forests belonging to them for which the department permits them free grazing.

Now it is getting late. We shall get down quickly, for, a night on the hills means a heavy bill of the Doctor, and illhealth for some months. May God help these poor brethren of ours, the "Guardians of The Hills!"

The Madras Forest Department Exhibition, 1936.

From 1915 to 1929, the participation by the Madras Forest Department in the Madras Park Fair Exhibition, was more or less an annual function. Since about 1930 onwards the "experimental wood workshop" at Olavakkot, which supplied a large number and variety of exhibits, ceased to function, the department did not find it worth while putting up a show, but the visitors were badly missing the Forest section in the exhibition.

With a view, however, to awaken and stimulate public interest in forestry, to show the superiority of wood to many of its rivals, in constructional work, and the possibilities of a more extensive and scientific utilization of the "jungle woods" by the latest preservative treatment, and in short, by way of some forest propaganda work, the Forest department of Madras again participated in the Park Fair Exhibition during the Christmas week of 1936.

The show this time was organised by Muhummad Abdul Hafiz Sahib Bahadur, B. A, the Forest Utilization Officer, assisted by the Curator of the Forest Musem, and two trained foresters.

The Gass Forest Museum had its usual and important share in the show, representative samples of all the chief Major, and Minor, Forest produce having been contributed by the museum. This was largely supplemented by exhibits collected by the Forest Utilization officer from his office, from various Divisional Forest officers, and from Dehra Dun. Our thanks are due to the various contributors of the exhibits, particularly to the Dehra Dun Institute who supplied a very spectacular

array of posters and pamphlets * on the various aspects of Forestry, such as the need and utility of forests to the agriculturist and the industrialist * alike, plywood manufacture, the methods of seasoning of timber, the advisability, mode and cost of preservative treatment of timber in respect of the less durable kinds, charts showing strength values of Indian timbers, consumption and manufacture of paper, and the like. Some more of the kind now on view at the Lucknow exhibition have been promised for future shows.

Lac and lac products from North Salem Division included "bleached lac" (bleached by the Research Ranger at Denkanikota), sealing wax acknowledged on all hands to be of a very superior grade and keeping quality, different grades of varnish and polish, being patronised by the Jail department and many wood-working institutes, shellac, silk-lac, lac-dye etc.

Another important section of the Forest exhibit related to wood preservation. " Wood preservation is destined to play an important part in the extensive and scientific use of treated timber for engineering structures in place of steel and concrete, which have recently made serious inroads into the structural field formerly occupied by untreated wood. Extensive timber utilization in a tropical country, where white ants and fungi abound, should be synonymous with cheap and efficient preservation ... ... A new preservative which appears to be superior to other known antiseptics for the preservation of wood has been evolved by the officer-in-charge of the Wood Preservation section (at Dehra Dun). The claims put forward for this preservative were investigated by a special committee appointed by

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* We wish to draw the reader's attention to the excellent booklet entitled " *Forest Research, and Indian Industry* " published by the Dehra Dun Research Institute in 1936. It emphasises the fact that this institute, though primarily founded for the benefit of the Indian Forest Department for which it has proved to be of great value, has another line of activity, viz., its use to other government departments such as the Railways and the Army, to Indian States, and to industrialists concerned with the utilization of timber and forest produce.

the Railway Board. A very favourable report on it was published. The committee recommended the immediate treatment of 1,50,000 sleepers with this new medium, the permanence and wood preserving efficiency of which was accepted *in toto*. This preservative which is known as *Ascu* should be of great value to the Forest Department and others, as it will enable them to exploit hitherto perishable woods for many purposes. Such woods can now be made to have the same durability as teak and sal."

The Madras Government as well as States like Mysore and Travancore were not slow to profit by the discovery. Madras has put up two pressure treating plants, resulting in an increased use of hitherto little used woods; treated electrical poles, sleepers, and building timbers have come in vogue on a large scale. Travancore is treating indigenous wooden poles for high voltage transmission, distribution and service lines, besides installing a telephone line of 200 miles, and *expects to save a sum to the tune of about seven lakhs of rupees in the course of the next five years!*

It is said that over 10,000 wood poles have already been Ascu-treated for the hydro-electric department of the United Provinces, and further orders are being received. 10,000 railway sleepers have been treated with the Ascu during the last year for the N. W. Railway.

Ascu consists chiefly of a small quantity of arsenic with a large quantity of copper salts which when combined in certain proportions impart immunity to wood from all forms of termite, and fungal, attacks. It is cheaper than creosting.

Particulars of cost and modes of application can be had from "Callender's Cable and Construction Company, Ltd., *Bombay.*" (There is a branch at 37, Second Line Beach, *Madras.*)

The Ascu exhibits in our Forest show consisted of (i) a few tins of the preservative (an orange coloured powder) each tin costing Rs. 2-8-0 and sufficient for making two gallons of the

(aqueous) solution, (ii) samples of different species of wood treated with it to show that it does not discolour wood and (iii) a few booklets giving full particulars of methods of use, working cost, etc.

There was also a sales-section on a small scale, the chief produce sold being, sandal wood billets and dust, horns of spotted deer and sambur, honey, walking sticks of *Poeciloneuron indicum*, polish and sealing wax from North Salem, etc.

Sandal sold well at 0–8–0 per pound. The billets were of different sizes ranging from about one to four pounds each, but were all of one quality. To many of the visitors,—some with high academic qualifications—it was news that certain forests of the Madras Presidency yielded sandal wood, and sandalwood of good quality. A large section of the public believed only in Mysore sandal. A prospective buyer — a friend of mine, was offered a billet for sale. After handling and smelling it all over, this fastidious gentleman returned it to me dissatisfied, saying that it did not even approach the Mysore quality. I then produced another billet — of the same quality — from a different shelf saying it was from Mysore. His face now beamed with a broad grin, and his hand dipped into his money purse, prepared to pay extra for the second billet. Before filling up the receipt form, however, I informed my friend that it was all said in jest, and that the billets were really of the same quality both from a Madras forest, and possibly pieces of the same branch ! We had a hearty laugh over it, my friend cursing his olfactory sense, but leaving our stall with a sandal piece in his hand bag " as good as the Mysore billet ! " It is hoped such prejudice will soon wear off.

The well finished walking sticks of *Poeciloneuron indicum* (Tamil : *Bootham-kolli*. Malayalam : *Vayila*. Kanarese : *Baligai*) received from Mangalore Division were much sought after, and admired, but it was found difficult to induce the buyer to part with a full rupee for a stick, though he was told the cost was nearly that, even at Mangalore, the extraction and transport

charges mounting high, owing to the species generally occuring in inaccessible areas. Mass production, and extraction if possible, from more accessible localities elsewhere in the Presidency might bring the cost of production sufficientiy low to create a much greater demand and sale. Apart from the eminent suitability of this species as a walking stick, there is a belief that its possession imparts to the owner immunity from the approach of the Devil. Unless the cost of production is reduced, I am afraid the stick will drive off more prospective buyers than devils !

Samples of polish manufactured at Denkanikota, (N. Salem Dn.) were distributed to some cabinet makers who have promised to place their orders after testing them. Two grades of sealing wax were offered for sale. To the average buyer, perhaps, the low grade was too low and the high grade too high.

From the large number of intelligent enquiries, and the huge concourse that seemed to appreciate and learn from the Forest exhibits, the exhibition can be said to have been an unqualified success, and of great educative value in forestry matters. Shows of the kind should go a long way to prove and emphasize the superiority of wood to many of its rivals in the building trade, and to make people aim at a cent per cent utilization of the hitherto-little-used and condemned " jungle woods" by an antiseptic treatment of them with the latest discovered preservatives like *Ascu,* — preservatives which by rendering such perishable woods termite—, and fungal-proof, at a low cost, virtually increase the output of durable timber in the Presidency. No less important were the elementary lessons imparted by certain exhibits. They enabled a good many to revise their notion that lac was a vegetable product, that sandal grew only in Mysore forests, that ply wood was yielded by a special tree in America, and so on. It was news to some that paper could be got from grass. Above all, a couple of colourful posters, kindly sent by the Dehra Dun Institute, greeted every literate visitor, reminding him, or her, that forests are necessary

for the fields, and to save the fields one must save the forests ! Propaganda on a wider scale and appealing to more of the people is worth while doing, by printing hand bills of a large number of the Forester's 'slogans' (laying stress on the relation of forestry to agriculture, industry etc.) in different vernaculars, and distributing them among people wherever there is a large gathering of them, supplemented, if possible, by a visual appeal by demonstration with suitable lantern slides, and even invoking the aid of celluloid !

— *Editor.*

COLLEGE NOTES.

I. Annual Athletic Sports, 1936.

The College Annual Athletic Sports were held on the 17th October 1936. Though there was not the usual interruption by rains, the weather was rather too hot for the competitors. The performance of students C. C. Monappa and S. H. Bagot who broke records was, therefore, the more creditable. Senior student Monappa won the Richmond Cup with twenty four points, and broke the record for putting the shot, while S. H. Bagot of the Junior Division broke the College (and Coimbatore District) record for Javelin throw. N. P. Choksi again proved the fastest cyclist in the College, though in the Olympic sports he could not exert his best owing to an unexpected accident.

The following are the details of the more important events of the sports :—

I. *Shot put* :

1. C. C. Monappa ... 29 ft. 9 in. (College record 27 ft. 7 in.)
2. N. P. Choksi.
3. E. G. De'Souza.

II. *High Jump* :

1. A. Olimuthu ... 5 ft.
2. S. H. Bagot.
3. J. A. Fernandez.

III. *100 yards* :

1. K. Dileep Singh,
2. C. C. Monappa.
3. A. Olimuthu.

IV. *Quarter-mile* :

1. C. C. Monappa.
2. P. K. Patnaik.
3. V. S. Holkar.

V. *Open half mile*:

1. A. Joseph (St. Michael's High School).
2. C. M. Batcha (Municipal High School).
3. V. R. Rao (Union High School)

VI. *Hurdles* :

1. K. Dileep Singh.
2. A. Olimuthu.
3. S. H. Bagot.

VII. *Long Jump* : ... 17 ft. 11 in.

1. K. Dileep Singh.
2. A. Olimuthu.
3. C. C. Monappa.

VIII, *Sack Scrimage* :

States A. (won).

IX. *Mile Race* : ... 5 min. 37 sec.

1. C C. Monappa.
2. P. K. Patnaik.
3. S. F. Uppin.

X. *Javelin throw* :

1. S. H. Bagot ... 120 ft. 2 in.
2. B. D. Nadkarni.
3. E. G. De'Souza.

XI. *Relay Race* :

Winning team : States.

XII. *Discus throw* : ... 78 ft. 6 in.

1. C. C. Monappa.
2. G. N. Mansukhani.
3. N. P. Choksi.

XIII. *Cycle Race* : ... 6 min. 10⅗ sec.

1. N. P. Choksi.
2. P. Inderson.
3. S. F. Uppin.

XIV. *Tug-of-war* :

Junior students. (Winners).

II. Swimming race and tests Nedungayam camp 1936.

At the beginning of the camp, there were only five students who could swim reasonably well, and another five who could just do so; the other eleven students could not swim at all! However, by the time the swimming tests and race came off all the students were able to swim and no one failed to pass the test.

There were three formal swimming parades every week, but the students indulged in swimming practically every day and that, no doubt, accounts for the satisfactory results.

The tests and race were held on 10–12–36; the Principal was the Judge, and Mr. R. H. Mitchell the starter; the results were as under :—

(a) *Race for the Gold medal — distanee about 140 yards.*

The entrants were :— 1, N. P. Choksi, (2) S. V. Venkataramanan, (3) W. Ramachandani, (4) Abdul Qadir, (5) A. De-Silva, (6) G. Ananthathirthan, (7) S. N. Venkatraman. (8) Z. Aubideen, (9) S. P. Uppin and (10) P. K. Patnaik.

Student N. P. Choksi won quite easily — his time was a little under 3 minutes. The next four in order of merit were:- S. V. Venkatramanan; W. Ramachandani; Abdul Quadir and A. DeSilva.

(b) *Race for "B" Class swimmers about 40 yards :—*

The following students competed :—

(1) Dileep Sinh (2) C. Chaubal (3) M. Shaik. (4) C. Monnappa (5) B. Nadkarni and (6) DeSouza.

Student Dileep Singh won and C. Monnappa was second : quite good for the latter, as he could not swim at all when camp started. The others completed the course. Students Nadkarni and DeSouza learnt to swim during this camp.

(c) *Test for "C" Class swimmers — about 1 chain :–*

The following students were placed in this class and all were declared to have passed :– (1) K. S. Sastri (2) D. Mannige (3) G. Ananthathirthan and (4) R. P. Patnaik.

EXTRACTS.

1. Nature and Functions of Soil Humus :

No problems of soil science have proved more difficult than those concerning the nature and functions of soil humus. The early work of Sprengel and Berzelius yielded a long list of humic and other acids which are still discussed in text-books and some scientific papers, even though it has long been shown that they are indefinite complexes greatly modified by the processes of extraction. Physical chemistry and microbiology have cleared up some of the problems involved in the acidity of peats and soils and in the decomposition of plant residues, but methods are still lacking for characterizing adequately the forms of humus in different types of soil.

The fundamental paradox is that, in the soil, cellulose is rapidly decomposed and humus is comparatively stable, whereas in the laboratory humus is readily oxidized under conditions in which cellulose is inert. It is now obvious that most of the steps in the decomposition of plant residues are effected by micro-organisms, and that the more stable products are colloidal complexes formed by the condensation of modified lignins from plants with protein degradation products from micro-organisms. Little progress has yet been made in unravelling the constitution of these complexes. In the past, loose analogies were too often drawn between the humus extracts from soils and the black mosses so readily produced in a variety of organic syntheses.

Agricultural investigations have brought out a bewildering array of special circumstances in which soil fertility appears to be related to the amount and form of soil organic matter or in which farmyard manure remedies some defect. Thus, the steady decline in yield in fifty years of continuous cereals at Woburn (not at Rothamsted as given by Waksman on p. 199) was associated with a loss of one third of the carbon and nitrogen originally present in the surface soil. Soil drift in the Canadian prairies and erosion in many parts of the tropics are the results of systems of land management which destroy soil organic matter by cutting off the normal additions and intensifying through cultivation the losses by oxidation. Farmyard manure and crop residues return to the soil the major plant foods, a variety of 'minor nutrient elements', and decomposible organic matter which forms colloidal complexes with high absorptive power.

The processes of soil formation are intimately linked with the growth of plants and the decomposition of their residues that the main subject matter of pedology might well be regarded as the ecology of humus. Already in forestry it is recognized that the natural humus type should determine the system of management, and it is almost certainly true that the proper husbanding of soil organic matter is the essential requirement for any stable system of agriculture.

The literature on soil humus is immense in volume and widely scattered, but much of it is poor in quality. A critical review to replace Wollny's book of 1897 was long overdue, and Prof. Waksman's monograph will be warmly welcomed by workers in agriculture and forestry and in the many pure sciences which bear on soil problems. It contains a bibliography of well over 1,300 papers, and a particularly useful historical summary which shows how confusion has arisen through the uncritical use of ideas, nomenclature and methods long after they had lost their scientific basis. The statement of recent work on the decomposition of plant products under experimental conditions should prepare the way for a much more cautious systematic approach to the more difficult problems presented by the behaviour of plant residues in natural and cultivated soils.

— *Nature, 10-10-1936.*

2. Original Laterite of Buchanan:

Much of the controversy as to the nomenclature of laterites has resulted from the fact that no exact data concerning Buchanan's original laterite have been available. In order to settle the question, Dr. C. S. Fox visited the type localities in Malabar during 1933. His results are now published (*Rec. Geol. Sur. India*, 389–422; 1936). From this paper, it is clear that Buchanan's laterite consists mainly of what would now be called lithomargic laterite and even, in part, lateritic lithomarge. The rocks studied by Buchanan represent but a stage in the passage from granites and gneisses, through kaolin or lithomarge, to a rock consisting mainly of hydrated oxides of alumina and iron in which combined silica is characteristically absent. The latter portion of this process of weathering is now generally known as lateritization, and the finished product is called laterite. Thus Buchanan's 'laterite' is an intermediate form needing some qualifying adjective such as *lithomargic*. Dr. Fox has shown a sense of proportion in recognizing the

facts of present usage. Otherwise, had he insisted on a purely academic application of the law of priority, the term laterite would have to be restricted to the lithomargic rocks studied by Buchanan ; a completely new term would have to be adopted for the high-level fully formed laterites of Deccan and elsewhere: and the term lateritization would have to be abandoned. Fortunately, there is no suggestion that any such confusion is likely to be introduced.

— *Nature, 10–10–1936.*

3. Briquetting of Charcoal :

Charcoal is a bulky and friable product which cannot be economically transported long distances. In India, forests are mostly situated at a great distance from big towns which are the main centres of consumption of charcoal, and as charcoal does not lend itself to long transport, charocal making is generally limited to meet the small demand of places near the centre of production. Briquetting, which reduces the volume of charcoal by about 50% and also makes it more compact and less friable seemed to offer a possible solution to the problem.

Moreover, when charcoal is made, a certain amount of smalls and dust are inevitable, and as there is no demand for these, they have to be thrown away as waste. (A small quantity of dust is used by horticulturists in preparing the soil for potted plants). By briquetting, charcoal dust can be converted into a useful fuel which can be be burnt like charcoal.

For these reasons a series of experiments were undertaken at the Forest Research Institute at Dehra Dun to find out (1) the best method of briqetting charcoal and (2) an efficient binder which was also economical to use. Preliminary experiments were made with the help of a small hydraulic press worked by hand, and later, further trials were carried out on a semi-commercial scale on an ovoid briquetting press driven by an electric motor.

In simple terms, briquetting consists in grinding charcoal into powder mixing it with a suitable binder and water and running the mix through a briquetting press. The briquettes contain a large amount of water when they come out of the press and have to be dried, a process which ordinarily takes about two to three weeks if the briquettes are spread out to dry in the air.

Charcoal is light or dense according the species from which it is made. A light charcoal like that of chirpine (*Pinus longifolia*) or mango (*Mangifera indica*) is more porous than the charcoal of Sal (*Shorea robusta* or Laurel (*Teminalia tomentosa*). It has been found that compared to a heavy charcoal a light charcoal requires more binder and also more water for briquetting.

Charcoal absorbs large quantities of water vapour from the surrounding atmosphere, and as the atmospheric humidity varies widelv according to the season, especially in Dehra Dun, it has been found that for the same kind of charocal using the same kind of binder and in the same proportion, more is required during dry weather than at other periods.

Real success in charcoal briquetting seems to rest on the use of a binder which should not only be efficient, but readily available and above all cheap. It should not be a product which gives off a lot of smoke or retards the burning properties, of the briquette. Thus, tar and pitch are good binding products, but they give off a lot of acrid smoke when burning and are therefore not suitable binders to use if the briquettes are to be used for domestic purposes. Numerous binders have been tried, at Dehra Dun including *Bauhinia retusa* gum, dextrin, rice, barley and other cereals, ground tamarind seeds, chopped and ground prickly pear plants, and molasses.

Bauhinia retusa gum gives a good strong briquette, when used in the proportion of 6%. Very strong briquettes are obtained when 5% of this gum is used together with 4% of rice. The trouble with *Bauhinia retusa* gum as a binder is that it is very difficult to grind into a powder unless it is quite dry, and during rainy weather it absorbs so much moisture that it has to be artificially dried before it can be ground. Various methods of using this gum have been tried, such as powdering and adding it to the charcoal when the latter is being ground in the mill, mixing the powdered gum with water and adding this thin paste to the charcoal, and grinding the charcoal with water and then adding the powdered gum. The most economical method is to grind the lumps of gum first in the grinder and then to add to it a suitable quantity of charcoal. Water is added last of all.

The starchy binders were ground to a fine powder and then made into a paste by boiling in water, and the paste was added to the charcoal while it was being ground in the mill. Of all the starchy binders tried, 5% rice gave the best results. The cheapest quality broken rice was used.

The testa or seed coat of tamarind seeds contains a sticky substance with binding properties, but as the testa could not be easily separated from the kernel, the whole seeds were ground and boiled in water to form a paste. This binder (6%) gave very good results. In various parts of South India tamarind seed is a waste product of little or no value and in such places it might be the cheapest binder to use.

As already mentioned above, the quantity of water required for briquetting with the binder sdescribed in the previous paragraphs varies according to the nature of the charcoal (light or dense) and the seasons. Speaking generally we can say that about 60 to 70 parts by weight of water is required for 100 parts of charcoal.

The grinding of the charcoal has a great influence on the strengths of the briquette. Not only is the charcoal converted into a powder in the grinder but it is also throughly mixed in it with the binder and water. Hence the more the grinding, the stronger the briquette. But, as grinding costs money, there is an economical limit beyond which one cannot go. In all the experiments at Dehra Dun it was found that grinding for ten minutes was quite sufficient for all practical purposes and this period was later strictly adhered to in all cases so that different binders could be compared. The grinder used in the experiments was an old *Soorki* mill. A *soorki* mill is all right for experimental purposes, where the time spent in loading and unloading by hand is immaterial. But, on a large commercial scale, some form of grinder with an automatic feed would be required. if cost is to be kept low.

When charcoal is ground, a lot of fine dust is produced which forms an explosive mixture with air. Any danger from this source can be avoided by adding water or the paste to the charcoal immediately after it is placed in the mill.

When prickly pear (*Opuntia sp.*) plants are chopped and ground in the mill, a sticky mass is formed, but this product makes but a rather weak binder. No water is required in this case, as there is plenty of water in the plants, but as the amount of water in the plant varies very widely according to the season, thc quantity of binder to be used has also to be varied acc ording to circumstances.

The following table gives a summary of the results of the charcoal briquetting experiments with various binders :—

Charcoal briquetting.

Serial No.	Binders used.		Nature of briquettes.		Cost of briquetting per maund of 80 lbs. of briquettes.	Remarks.
	Name.	Percentage.	Strength.	Burning qualities	Rs. A. P.	
1	Rice.	5	Strong.	Good.	0 3 11	
2	*Bauhinia retusa* gum.	6	Strong.	Good.	0 7 0	
3	Rice. *Bauhinia retusa gum.*	4 5	Strong.	Good.	0 8 2	These briquettes are stronger than those made with rice alone or gum alone as binders.
4	*Tamarind* seeds	6	Strong.	Good.	0 2 11	
5	*Opuntia* sp. chopped and ground.	100 to 125	Weak.	Very Good.	—	No water used.
6	Malasses	70 to 80	Very Strong.	Good but smoky.	—	No water used.

Notes :– 1. Cost of briquetting includes interest on capital at 6%, depreciation on machinery at 20% power charges and labour, but does not include the cost of charcoal.

2. Burning tests : Charcoal briquettes being highly compressed and with a smooth surface do not catch fire quite so easily as ordinary charcoal nor do they burn as vigorously as charcoal. But, briquettes burn more steadily and last twice as long as charcoal for one filling of a stove. Nos. 1, 2, 3, 4 & 5 in the above table give off no smoke when buring, except a very small quantity when the fire is lighted.

3. The briquettes prepared with the various binders shown in the table were not affected by storage of over two years, the only exception being the molasses briquettes, which absorbed a large amount of moisture from the atmosphere during the rainy season. Baking the molasses briquettes at a low heat in oven solves this problem, but adds to the cost.

Conclusions :

From the view point of the consumer charcoal dust briquettes do not appear to offer any outstanding advantages over ordinary charcoal and so he cannot be expected to pay for such briquettes a price higher than he pays for charcoal. This means that the cost of briquetting charcoal dust must be kept as low aa possible, and in this connection the use of rice and tamarind seeds as binders offers commercial possibilities.

Briquetting of good charcoal which can be sold as such is not a commercial proposition. A good method to adopt is to pass the charcoal as it is taken out of a kiln on a coarse sieve with 1 inch holes and to use for briquetting only the dust and small pieces which fall through. The big pieces which remain on the sieve should be bagged and sold as charcoal.

— From Imperial Forest Economist's note on briquetting of charcoal.

4. Study of Trees and Crops:

HYDERABAD, Jan. 6.

Mr. H. G. Champion presiding over the Botany section of the Indian Science Congress in Jan. 1937, said:

"Very little is yet known, about the physiology of the individual tree, and still less of the physiology of the tree crops. What little information has been obtained nearly all refers to temperate climates, leaving the tropical forests almost unexplored. Only small beginnings have been made of the study of the tropical forest in relation to the soil, to genetic problems and to ecological problems of competition and succession. The study of trees and crops calls for a special technique both in the collection of data and their analysis. India is in a unique and very favourable position to lead the world in this field, the problems awaiting solution being full of interest to the scientific worker and full of importanee on their eoonomic side."

— Madras Mail, 6-1-37.

5. Preventing end-checking :

" After months of research the chemists of the E. L Bruce Co., of Memphis, Tenn, have hit upon a combination of chemicals that has proved effective in preventing end-checking in timbers, sleepers, etc. It has been named " Bruce No-chek. " This material has now been given 18 months of trial and users have declared it effective in preventing serious end-checking.

The company has now placed " No chek " on the market, confident that it offers an end-seal which effectively prevents end-checking and will save lumbermen money and much worry. The material is applied to the ends of green timber with a putty knife. About 6 lbs. is required for 1000 bd. ft. lumber."

— *Timber Trades Journal. 28–11–36.*

It is perhaps worth while trying this material — ' No chek ' — in India, and seeing if it is cheap and efficient enough. Painting the ends of sleepers immediately after sawing might reduce the percentage of rejection.

— *Ed.*

6. Wood protection :

The Sote-Fjord Canal, Sweden, which was opened last October is unique in that all the wood in its construction, and especially the piling, is provided with a protective coating of arsenic concrete. This material which is patented, is produced by mixing cement, sand and arsenic oxide. Timbers so treated are said to be resistant to the attack of the ship worm.

— *The Timber Trades Journal. 11–7–36.*

7. Indian Science Abstracts :

The immense volume of original work now published necessitates a very complete system of abstracts, and the requirements of the individual sciences are now well served in this respect. Rarely, however, is an attempt made to abstract separately the scientific publications of any country, so that it is not possible to estimate its direct contributions to knowledge. Prior to the Great War, the now defunct Board of Scientific Advice published annually a resume of the principal Indian scientific memoirs, and now, after the lapse of many years, the National Institute of Sciences in India has undertaken the much more difficult task of compiling an annual bibliography of science in India. This comprises not only the titles of all papers published by authors resident in India and of Indians

working abroad, but also of papers dealing with problems specifically related to India. In the majority of cases, not only is the title of the paper given, but it is also followed by a brief but adequate, abstract. To those who look upon India as a backward country this publication will come as a revelation, not merely from the volume of the work produced but also by the high standard to which much of it attains. In a country so predominantly agricultural it is gratifying to find that so much attention is being paid to biological subjects ; nearly one half of the abstracts come under the heads of botany, zoology and physiology the latter including veterinary and medical subjects. As the general editor points out in his introduction, the present division of subjects, which is under nine main heads, is purely tentative and may require revision in the light of experience.

— *Nature. 28-11-36.*

8. Rejuvenating Old Rubber Trees :

Although for some time past inorganic fertilizers have been successfully used for young *Hevea* trees, of late they have scarcely been used at all for old or deteriorated stands, partly owing to the economic depression in the rubber world, and partly because many planters were not convinced that it 'paid to fertilize'. During these last five or six lean years, however, Dr. W. B. Hains, of Dunlop Plantations, Ltd., and E. Guest have been conducting a series of large-scale experiments on the manuring of *Hevea* in Malaya, and have arrived at some important conclusions (*Empire J. Exp. Agric.*, Oct., 1936). These authors give 'chapter and verse' for their conclusion that the primary need of old or deteriorated rubber trees is nitrogen ; young trees, however, mostly need 'minerals' as well. Response to manuring with nitrogen (4 lb. of sulphate of ammonia per tree) usually occurs in two stages. In the first, which is associated with improved foliage, the yield of latex increases by about 10 per cent : in the second, associated with improved bark renewal, the increase in yield averages about 35 per sent but does not begin until the second or third year after the initial application. As a rule, it does not pay to apply nitrogen unless the latex-yield has fallen below 400 lb. per acre ; and it is suggested that the best criterion of the need of nitrogen is given by the growth-rate of the tree : when the annual girth-increment has fallen to, or below, ½ inch per annum, quick response to nitrogen may be confidently expected.

— *Nature. 28-11-36.*

9. The Second World Forestry Congress ; 1936 :

The following were among the more important resolutions & recommendations of the second world forestry congress which met in September 1936 at Budapest :—

1. The Congress expresses the desire that the Committee of International Forestry Statistics and the International Union of Forestry Research Institutes shall take steps with a view to the adoption of uniform methods and terminology in the forestry balance sheet so as to be in a position to institute the means for comparing the forestry statistics of the different countries and to unify as far as possible world statistics.

It recommends the organization in the various countries of :–

(1) A uniform schedule of forest resources, wherein there shall be indicated the capital resources in timber and the annual woody increment, and to renew this stock-taking from time to time;

(2) An accurate check on fellings and the utilisation of timber, which should be so developed as to become a series of permanent statistics on as large a scale as possible.

2. The Congress recommends :—

(1) That management schemes alike theoretical and practical, for small private forest holdings should be worked out ; (2) That investigations of the various aspects of this question should be carried out in a number of countries.

3. It considers it desirable that a thorough investigation should be undertaken in the various countries to determine the reasons for variations, which take place in annual increment in regard to trees and stands.

4. Being aware that the International Union of Forestry Research Institutes is in process of organizing a bibliography containing the titles of the publications, which have been published in Reviews of different countries;

Being aware that the *Forstliche "Rundschau der Zeitschrift ur Weltforstwirtschaft"* has published, for some years past, abstracts of works and articles in all countries, prepared by national contributors and that it intends to increase its present staff by the addition of persons from other countries and to publish its abstracts in different languages; the Congress considers it desirable to complete this work by the publication of the abstracts of the works, and articles that have been issued.

5. Recognising the necessity for the establishment of international rules for questions relating to sawn timber and for the introduction of a uniform terminology as also for a unification in international trade and practice in this connection, the Congress recommends the establishment of a Committee, which shall undertake a detailed study of this question on the basis of the reports submitted to the Congress.

6. It recommends the collection, unification and publication of the reduction coefficients employed in the different countries for the conversion of the units and methods of measurements in current use into standard measurements.

7. The Congress recommends the establishment of a commission which shall undertake the investigation of the problem of the organization and system of timber markets and to bring before the next International Forestry Congress the information or results obtained.

8. It is of opinion :—

(1) That, by means of an adequate legislation, the State should intervene not only in connection with the forestry system as applied to forests, but also for the working and industrialisation of timber products, so as to establish the necessary harmony between capital, labour and natural conditions. The application of this general principle may eliminate dumping on the world market.

The State should also intervene :—

(2) For the standardisation of the world production of unworked timber, by the regulation of fellings in each country;

(3) For the encouragement of the industries utilising semi-worked products and timber refuse;

(4) For the realisation of an international collaboration of Research Institutions and Forestry Administrations, which will bring about intensive production and the remunerative sale of resin ;

(5) For the systematic collection of forest seeds by the Forestry Administrations and the Research Institutes and the communication to each country, by means of exchange, of the information obtained ;

(6) For an intensive propaganda in each country by the institution of a special Week for the purpose, with a view to demonstrating the importance of forest fruits and plants, so as to enhance their value and ensure their realisation.

9. It expresses the desire that more attention should be given to the study of geographical conditions in forest economy.

It is of opinion that with a view to securing a more positive success, the studies of forestry regions should be entrusted to the Forestry Research Institutes, within which there should be organized for the purpose, special Sections for Forest economic policy.

It further expresses the desire that Forest Geography be introduced as a special subject in the Forestry Higher Schools.

10. It declares itself convinced of the necessity for developing a policy in favour of the utilization of timber, by means of national organizations specialized in this problem ; It would encourage the creation of such organizations in all countries where they are not yet in existence; It would invite the Governments and forestry circles in all countries to associate themselves with these efforts and to support by every means the activity of the national organizations ; It would recommend that the International Timber Committee be invited to handle technological and chemical questions, by cooperation with experts in the subject, and also with other existing organizations.

11. It calls on the Governments of the States represented, inviting them to give special attention to this very important question from standpoint of the maintenance of forests, extending it to countries where such selection has not so far been in force; and, among the methods of obtaining pure seeds indicated in the course of the discussion of the Congress, to decide on those considered the most appropriate to the special conditions of the respective countries.

12. In order to ensure the permanent possibility of testing the origin of seeds of forest stands in international trade, the Congress urges fosestry workers in all countries to approach their competent authorities so as to obtain from them decisions establishing the methods of such control or testing, and ensuring its proper performance. As a general basis for this control, it would be advisable to introduce a system of certificates attesting the orgin of the seeds. These certificates should contain :—

(*a*) the specification of the characteristics of a given country in respect of climate and cultivation;

(*b*) the specification of the value of seeds based on the results obtained in the Seed Trials Station of the country;

(*c*) the specification of the part of the seeds. to which the certificate in question relates, by means of the indication of the quantities of the stock and of the special packing marks.

The issue of these certificates of origin for seeds should be entrusted to a single Forestry Research Institute only on the territory of each State. These Institutes should also come to agreement as to the details of the organization of the international control of seeds, through the intermediary of the international Institute of Agriculture.

13. The Congress considers it desirable that a joint international organization for the study of the sociology of forest plants should promote co-operation, and should establish uniformity in the naming of forest plant associations.

It considers that such a joint international body should undertake to establish and to maintain a list of forest plant associations, formed in accordance with the lines laid down in the Report and internationally recognised, as well as of their variants. In particular, this organisation should establish the principles to be observed in view of an international forest phyto-sociological cartography.

14. It considers :—

(1) That forestry workers should call the attention of the respective Governments to the fact that the afforestation of bare lands is one of the most important economic problems of the near future;

(2) That the forestry workers in each State should be invited to present, on the occasion of future forestry congresses, reports on the afforestations of bare lands in their respective countries, in general, as well as, in particular, on the extent and methods of carrying out such afforestations;

(3) That it would be desirable to establish an international statistic of the afforestations of bare lands.

15. It recommends the system of terrace re-afforestation on arid and calcareous lands and on hill-sides with a pronounced slope towards the south;

It further considers that, in order to ensure the efficacy of this system, it may at times be necessary to hold up these terraces, either by wattle fencing or by low walls. Even if the cost of this system is somewhat higher than for other systems employed, the success of the forestry and land drainage operations is thereby ensured.

16. It recommends:—

(1) The study, at the place of origin, of all pullulations of noxious insects by professianal forestry entomologists, directed by a central organization established for the whole country, or, according to size, for a department. The influence of invironment on the movement of masses of insects should always be studied at the point of origin itself. At the same time, it is essential to investigate; in what way such pullulation influences the vitality and the reproductiou of the species in connection with the saturation of the living area; when this point of saturation is reached and what are the resulting reactions for the species. For accomplishment of these investigations, which must be adequately subsidised by the State, forest laboratories, transportable and well equipped, should be organized, which can be set up at any time at the places of pullulation. In these laboratories, studies may be made of the origin, of the development of the pullulation and of the factors in the crisis;

(2) The establishment of permanent forest laboratories. in order that the influence of the living and dead natural environment and of other factors on the movement of the masses of noxious insects during calm periods, may be properly understood. It is advisable to organize the distribution of these permanent laboratories in accordance with the different climatic zones. It is necessary that the laboratories should be situated in the centre of the main routes followed by the insects and in areas outside the danger zone, being in every case placed directly in the privately owned forests. Apart from the study of biotic factors, it is especially necessary to give attention to the influence of abiotic factors (climate, weather, local climate, microclimate, etc, .on insects and on their parasites. The laboratories, whether movable or permanent, should organize bioclimatic observation stations, suitable for biological studies. The object of these studies is to discover precisely tho best types of forest formations and cultivation methods which afford the greatest resistance of environment to the chief kinds of noxious insects, in other words, those which set up conditions which are most distinctly unfavourable to the dovelopment and viability of such insects.

(3) The establishment of forestry stations in the remaining areas of virgin forests. The special function of these will be the study of the movement of the chief noxious insects of the cultivated forests in areas not touched by man, and the gaining of knowledge of the favourable elements in such areas.

— *International Review of Agriculture Oct. 1936,*

Notifications relating to Rangers.

Waltair Circle.

24—10—36. Mr. T. M. Doraswami Pillai, Ranger Third grade leave for 4 months from date of relief preparatory to retirement.

11—11—36. Mr. N. Chakrapani Iyengar, to Rapur Range, Nellore Division. 2. Mr. Ch. Ramamurthi, on relief of Palakonda Range to Gudem Agency Range. in relief of Mr. J. D. Theodre, Ranger Fifth grade, transferred to Ootacamund circle.

16—11—36. Mr. G. Apparao Naidu, to Repalli Range, Guntur Division.

2—12—36. Mr. I. Sambasivarao Naidu, to Narasapatam Range, Vizagapatnam division in relief of Mr. P. Dhananjayarao granted leave.

21—12—36. Mr. P. Chengalreddi, Ranger Fifth grade to Gudem Agency Range, Vizagapatam Division in relief of Mr. J. D. Theodore, transferred to Ooty Circle.

20—1—37. Mr. K. Subbanna, Forester Third grade to charge of Sathiavedu Range, Nellore Division. 2. V. Rangachari on on relief by No. 1 to Narasapatam Range, Vizagapatam Dn.

7—2—37. Mr. K Subbanna, to charge of Narasapatam Range. Vizag. Division.

Bellary Circle.

6—11—36 Mr. A. Sitaramiah, Turimalla Range, leave for three months from date of relief. 2. Mr. C. J. Nanjappa, Trained Forester, Cuddapah South divison to be in charge of Turimella Range *vice* No. (1).

12—11—36. S. M. Krishnaswami Ayyar, to Turimella Range, Kurnool East Division. 2. Mr. C. J. Nanjappa, trained Forester on relief by No. (1) will revert to his permanent post as Forester in Cuddapah South division.

3—12—36. Mr. T. M. Krishnamachari, Vempallai Range, Cuddapah North division leave for three months, 2. Mr. M. S. Subbayya, Trained Forester posted to Kurnool West Division is appointed to act as Ranger, Vempalli Range, of Cuddapah North Division *vice* No. (1) above.

9—12—36. Mr. A. Bhaviah, Ranger, on return from leave on 11-12-36 to Giddalore Range, Kurnool South division. (2) Mr. B. M. Boppayya, Trained Forester and acting Ranger, Giddalore Range on relief by No. 1 will revert to his permanent post and await further orders.

19—12—36. Mr. V. N. Subramanya Ayyar, Gundlakamma Range will be in additional charge of Giddalore range and relieve trained Forester Bopayya about the 26th December 1936. (2) Trained Forester B. M, Bopayya on relief by No. 1 is posted to Vontimitta range of Cuddapah North division and relieve Mr. S. Ramachandra Ayyar on 2nd January 1937. (3) Mr. S, Ramachandra Ayyar on relief by No. 2 is posted as Senior Instructor, V. T. S. Cuddapah North division, (4) Mr. P. Shanmughasundaram Pillai, Special Duty Ranger Kurnool South division, to Pecheruvu Range of Kurnool West division releiving Mr, A. K. Sheriff on 31st December 1936. (5) Mr. A. K. Sheriff on relief by No. 4 to Bairlutty Range of Kurnool West division relieving Mr. D. V. Nagarathnam on 4–1–37. (6) Mr. D. V. Nagarathnam on relief by No. 5 is posted a Junior instructor, V. T. S. Cuddapah.

6—1—37. Mr. K. Tiruvenkatachari, Ranger, Sivapuram Range, Kurnool West leave for eight months.

6—1—37. Mr. M. Umapathy Mudaliar, Kurnool South division extension of leave for four months from 3–1–37.

3—1—37. Mr. A. Bhaviah to Giddalore Range, Kurnool South.

8—1—37. Owing to the shortage of rangers on account of the retirement of one ranger and appointment of two Range Officers as instructors to the Vernacular Training School the leave granted to Mr. T. N. Krishnamachari, Range Officer, Vempalli is cancelled. 2. Posting of Trained forester M. S. Subbiah to Vempally Range is cancelled and he is posted as Range Officer, Yerragondapalyam of Kurnool East Division *vice* Ranger A. Vyasulu.

4—2—37. Mr. Sitharamiah, on return from leave on 10–2–1937 to Sivapuram Range io Kurnool West division to relieve Mr. A. K. Sheriff.

4—2—37. A. Sitaramayya to Turimella Range of Kurncol East division, 2. Trained Forester, C. J. Nanjappa on relief by No. 1 will work for a fortnight on special duty under the direct orders of the District Forest Officer, Kurnool East and on relief posted to Sivapuram Range of Kurnool West division.

Salem Circle.

5—11—36. Mr. M. S. Krishnaswami Ayyar, on return from leave on 21–11–1936, to Dharmapuri Range, Salem North division. to relieve Mr. M. B. Kalappa, of the additional charge. 2. Mr. C. B. Ekambaram, Trained Forester will continue to act as Ranger last grade with effect from 21–11–1936, *vice* Mr. K. M. Gopalachari, granted leave preparatory to retirement or until further orders.

9—11—36. Consequent on the return to duty from leave of Mr. P. B. Syed Yahia Saheb on 10—10—1936, Mr. C. B. Pemmiah, Trained Forester Second grade and acting Ranger last grade

in charge of Harur Range, will continue to act as Ranger last grade *vice* Mr. M. P. Philip, granted leave, with effect from 10-10-1936 or until further orders. 2. Mr. A. Yangnaswami, Trained Forester Fifth grade and Ag. Ranger last grade, in charge of Thammampatti Range, Salem South Division (who was acting in vacancy of Mr. M. P. Philip), will be considered to be Forester Fifth grade in charge of Thammampatti Range with an enhanced Fixed Travelling allowance of Rs. 13—2—0 with effect from 10-10-1936 or until further orders.

18—11—36. Mr. Syed Munavar Sahib, to Tammampatti Range of Salem South Division.

28—11—36. Mr. M. P. Philip, Vellore East division, to Chandragiri Range, Chittoor division, reverting Mr. M. M. Ponnappa. (2) Mr. C. B. Pemmiah, Trained Forester Second grade (who was acting as Ranger last grade in the leave vacancy of Mr. M. P. Philip) will continue to act as Ranger last grade in charge of Harur Range, Salem Central division, *vice* Mr, K. M. Gopalachari granted leave preparatory to retirement or until further orders. (3) Mr. C. B. Ekambaram, Trained Forester Second grade and acting Ranger last grade in charge of Rasipur range. Salem South division, will revert as Forester and continue to hold charge of the Range with an enhanced fixed travelling allowance of Rs. 13-2-0 for Range charge, until further orders.

6—12—36. Mr. M. Pakyanathan, Chengam Range, Vellore West division, granted leave for 4 months from date of relief. (2) Mr. C. B. Ekambaram, Trained Forester Second grade in charge of Rasipuram range, Salem South division (with enhanced fixed travelling allowanee of Rs. 13-2-0) will act as Ranger last grade with effect from the date of relief of No. 1 and continue to hold charge of Rasipur range.

23—12—36. Mr. M. P. Philip, Chandragiri range, to Vellore West division to Chengum Range, *vice* Mr. Pakiyanathan, granted leave, for 4 months from date of relief. (2) Mr. M. M. Ponnappa, Trained Forester Fifth grade, Chittoor division, (on completion of his special duty in charge of Forest Stall at Madras Park Fair Exhibitiun), is posted to the charge of Chandragiri range with enhanced fixed travelling allowance of Rs. 13-2-0 for Range.

20—1—37. Mr. M. M. Ponnappa, Trained Forester iu charge of Chandragiri Range, Chittoor division, will act as Ranger last grade with effect from 14-1-1937, *vice*, M. Pakyanathan, Ranger First grade on leave or until further orders, and continue to hold charge of Chandragiri Range.

27—1—37. Mr. T. R. Rajagopalan, Trained Forester (M. R. H.) Coimbatore Circle, appointed to act as Ranger last grade, *vice* Ranger T. S. Ramalinga Ayyar, Seventh grade, under

suspension posted to the charge of Turaiyur Range, Salem South division. 2. Mr. A. Yagnaswami, Trained Forester Fith grade in charge of Turaiyur Range with enhanced fixed travelling allowance of Rs. 13—2—0 will on relief by No. 1, revert to his permanent post in Vellore East division.

6—1—37. Mr. M. V. Ganasen, Turaiyur Range, Salem South division, leave for 2 months from on 26-12-1936. 2. Mr. A. Yagnaswami, Trained Forester Fith grade, Vellore East division, to charge of Turaiyur range with enhaneed fixed travelling allowance of Rs. 13-2-0 for Range charge.

Coimbatore Circle.

10—10—36. Mr. V. Panchapakesa Ayyar, M. R. H. Forester, promoted to act as Ranger Seventh grade, to charge of Ramapuram Range. 2. Mr. A. M. Srinivasan, on relief by No. 1 posted to Kollegal Range.

3—11—36. Mr. S. Sundaravaradachary, on return from leave to Pollachi Range. 2. Mr. I. John, on relief by No. 1 to Ramapuram Range, Kollegal division. 3. Trained Forester Mr. V. Panchapakesa Ayyar on relief by No. 2 is transfered to Tinnevelly division.

21—11—36. Mr. I. John, Pollachi Range, leave for 4 months.

23—11—36. Trained Forester T. R. Rajagopalan in charge of Ulandi Range will act as Ranger Seventh grade from 13-9-1936 *vice* Ranger C. Thiruvengam Pillai granted leave up to 3-1-1937. 2. Trained Forester M. D. Pichai Pillai posted as Assistant Instructor, V. T. S. Coimbatore South division, will act as Ranger Seventh grade from 1-10-1936 *vice* Ranger R. Rama Ayyar granted leave up to 7-12-1936. 3. Trained Forester V. Panchapakesa Ayyar in charge of Ramapuram Range Kollegal division will act as Ranger Seventh grade from 23-10-1936 *vice* Ranger K. O. Anandan granted leave up to 30-11-1936.

24—11—36. Mr. K. O. Anandan to Kollegal Range.

2—12—36. Trained Forester T. R. Rajagopalan in charge of Ulandi Range will continue to act as Ranger Seventh grade *vice* Ranger I. John granted leave for 4 months from 24-11-1936. 2. Trained Forester M. D. Pichai Pillai posted as Assistant Instrnctor V. T. S., Coimbatore South Division, will continue to act as Ranger Seventh grade *vicc* Ranger A. M. Srinivasam granted leave for 3 months from 17-11-1936 3. Trained Forester V. Panchapakesa Ayyar in charge of Ramapuram Range Kollegal Division will continue to act as Ranger Seventh grade *vice* Ranger C. Thiruvengandam Pillai on leave up to 8-1-1937.

7—12—36. On relief by Ranger R. Rama Ayyar Mr. M. Gopalaswami Naidu. Temporary Ranger Seventh grade to charge of Kodaikanal Range.

24—12—36. Mr. C. Thiruvengadam Pillai posted to Ramapuram Range, Kollegal division.

Ootacamund Cricle.

12—11—36. Mr. K. Dhooma Shetty, Bolampatty Range, in relief of Mr. T. Perumal Goundar, granted leave.

12—11—36. Mr. D. Ramakrishnaiah, to Sigur Range.

13—11—36. Mr. T. Perumal Gowndar, Bolampatty Range, leave for four months.

13—12—36. Mr. J. D. Theodore, to be Assistant to Range Officer, Begur, Wynaad Divison. 2. Mr. P. K. Sankara Menon, Trained Forester and Assistant to the Range Officer, Begur, on relief by No. (1) transferred to Nilambur Division.

20—12—36. Mr. P. K. Sankara Menon, Acting Ranger last grade and Assistant Range Officer, Begur leave for three months from 5th January 1937.

25—12—36. Mr. B. M. Coates, on return from leave to Sigur Range the Nilgiris Division.

28—12—36. Mr. K. Raghavan to Udipi Range, Mangalore North Division *vice* Mr. K. Karunakaran Nambiar granted leave.

28—12—36. Mr. K. Karunakaran Nambiar, Udipi Range, Manga-North Division, leave for four months.

8—1—37. Mr. B. M. Coates, extension of leave for two months from 5th January 1937.

8—1—37. Mr. C. J. Muthanna, Trained Forester, to charge of Sigur Rauge, the Nilgiris Division.

27—1—37. Mr P. K. Sankara Menon, Trained Forester, on return from leave, to charge of Puttur Range, Mangalore South Division. 2. Mr. K. Kunhirama Menon, in charge of Puttur Range, on relief, to Mudumalai Range, the Nilgiris Division, to take over on or about 8th April 1937. Mr. A, K. Kunhunni Nair, Mudumalai Range, on relief by No. (2) to Amarampalam Range, Nilambur Division, *vice* Khan Sahib Knnhiroyan Sahib granted leave from 5th April 1937.

27—1—37. Mr. Khan Sahib K. Kunhiroyan Sahib, Ranger First grade, granted leave for four months from date of relief.

NOTICE.

Indian Forester Prize — 1937.

Essay for the PAST and PRESENT Students of the College.

Although every endeavour has been made in the past to set subjects for essays which will appeal to past and present students respectively, the number of entries has been disappcintingly small in recent years, and the element of competition has been nearly absent.

Accordingly only one subject, common for both past and present students, is set for 1937 viz., —

" The Minor Forests : How can they be Better Protected and Improved ? "

If there are sufficient entries to warrant it, the prize will be awarded as follows :—

First Prize Rs. 30/- in cash ; 2nd Prize Rs. 20/- in cash.

No award will be made unless a satisfactory standard is reached. The essay should be clearly written or typed on one side of the paper only and should not exceed 2000 words. It should be submitted to reach the Principal, Madras Forest College, between the 10th May and 1st June 1937. Any not received within this period will not be considered. The essay should be the unaided work of the competitor.

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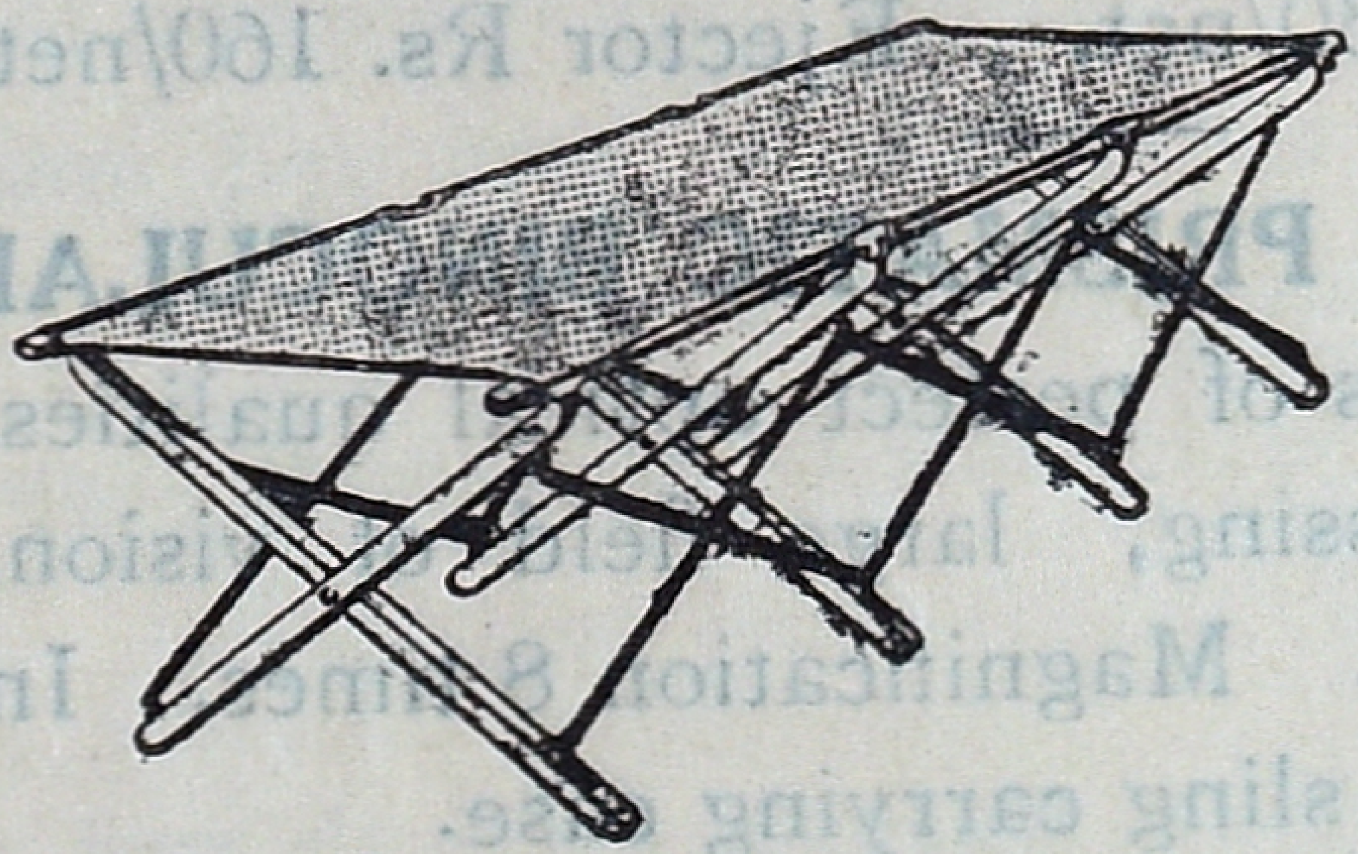

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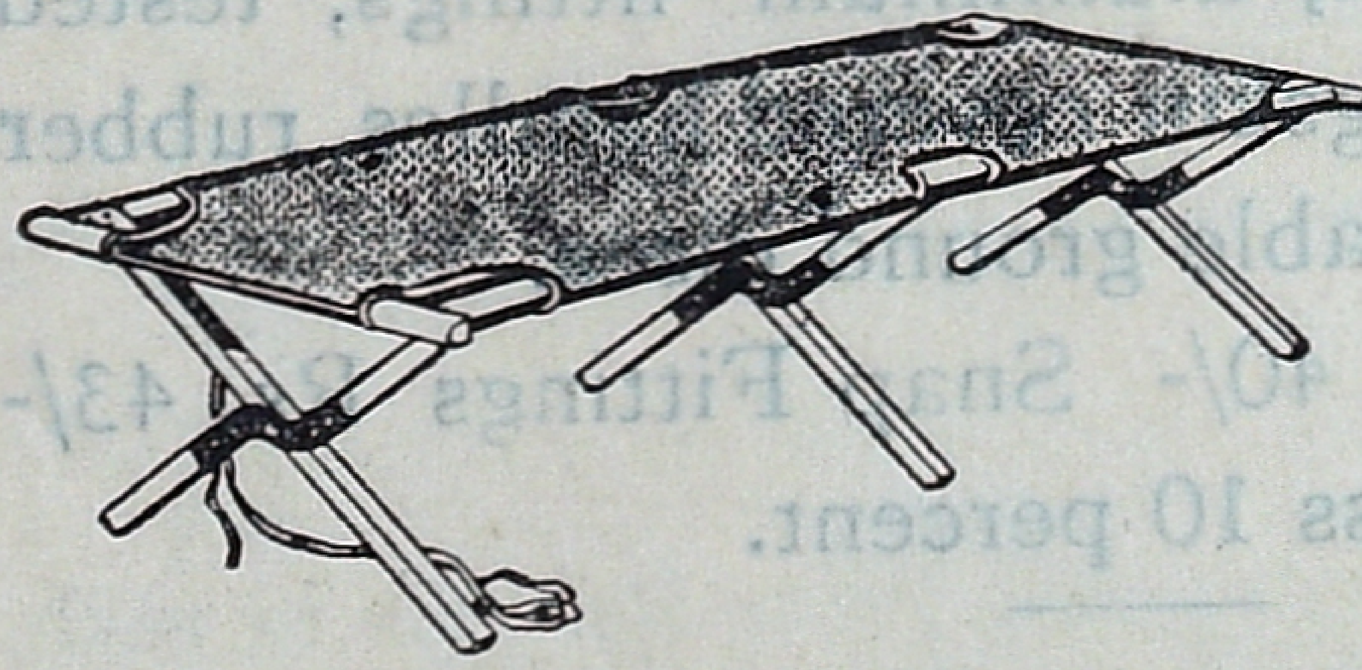

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